INDUSTRIAL DIAMOND ABSTRACTS

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DIAMOND MINING AND INDUSTRY

New diamond field

Anon. *Mine & Quarry Engg* 1958 Vol 24 (8) p 343 (Aug)

In the Makhotlong area of Basutoland, successful prospecting for diamonds was reported in 1956, and small industrials and gems are now being found there and sold through normal channels. The pipe is kimberlite and of roughly the same surface area as the Kimberley Big Hole. *A* *C 1.21*

Liberia's diamond laws

Anon. *Min Journ* 1958 Vol 251 (6429) p 506 (Nov 7)

Figures for Liberian diamond exports, 1957, are given. Changes in the laws relating to the Liberian diamond industry are summarized. *W* *C 1.5*

Diamonds in British Columbia

Anon. *Engg & Min Journ* 1958 Vol 159 (9) p 164 (Sep)

Stream gravels in undisclosed position have yielded seven or eight diamonds of about 10 milligrams, one of them around 0.3 carats. *A* *C 1.24*

Diamond crystal in the kimberlite from the pipe 'Udachnaya'

L. A. Popugaeva, I. I. Shafranovsky. *Zap vses mineralog obshch* 1958 Vol 87 (4) pp 494-495 (In Russian)

1 illustr. *X* *C 1.24*

Diamonds USSR

Anon. *Min Trade Notes* 1958 Vol 47 (3) pp 30, 32 (Sep)

Isolated diamond discoveries have been reported from different parts of the country for more than a century. The 1928-38 exploration resulted in the discovery of small low-grade placer deposits in the Ural Mountains. In 1949 the first Yakutia diamond was found, and by 1954 several placers and diamond lodes were also discovered there, many of which have commercial value. *A* *C 1.24*

Best Wishes for Christmas and the New Year are extended to all readers of *Industrial Diamond Abstracts* and users of the Information Bureau Loan Service.

[Yakutia seven-year plan]

Anon. *Min Journ* 1958 Vol 251 (6428) p 478 (Oct 31)

A 7-year plan has been drafted for the Yakutia diamond industry. It envisages a diamond output which will meet Soviet demands for industrials and gems, leaving a surplus for export. A port is to be built on the River Lena to handle cargo for the diamond industry. *W* *C 1.24*

Rouble diplomacy at work

Anon. *The Times* 1958 (54301) p 11 (Nov 6)

The implications of recent moves in Soviet overseas trading are discussed. It is mentioned that gold, oil, and diamonds are now being exported.

W *C 1.4*

Diamonds in the European part of the USSR

Anon. *Geog v shkole* 1958 Vol 21 (3) p 61 (May-June); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1780 (Sep) (Original in Russian)

X *C 1.24*

Yakut diamonds

B. Babliuk. *Sib ogni* 1958 Vol 37 (5) pp 101-116 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1951 (Sep) (Original in Russian)

X *C 1.24*

Development of a new branch of industry in the Yakut ASSR [diamond industry]

G. V. Naumov. *Izv AN SSSR Ser geog* 1958 (2) pp 101-106 (Mar-Apr); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1951 (Sep) (Original in Russian)

X *C 1.24*

The land where they prospect for diamonds

L. Paseniuk. *Don* 1958 Vol 2 (5) pp 115-125 (May); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1951 (Sep) (Original in Russian)

X *C 1.24*

Diamonds are trumps

J. D. S. Wade. *Wire Lines* 1958 (7) pp 10-12

A general discussion covering diamond mining, separating, and polishing. A brief mention is made of the industrial uses of diamond. 4 illustr.

W *C 1.2 : C 1.3 : C 1.6 : D 4.0*

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PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND AND OTHER HARD MATERIALS

Electron bombardment of counting diamonds

G. W. Dolphin, K. Stratton. *Proc Roy Soc A* 1958 Vol 244 (1238) pp 424-435 (Mar 25)

Electron bombardment offers some advantages over neutron bombardment in that under certain conditions the damage to a perfect lattice might be expected to consist of single or very small groups of interstitial atoms and vacant sites randomly distributed. The effects of electron bombardment at higher energy (13.5 MeV) on the counting properties of diamond are described and interpreted in terms of the production of additional lattice defects.

In the experiments, the counting response of the diamonds for α- and β radiation was examined before bombardments, until the pulses were reduced below the noise level of the amplifier. The minimum polarization condition was achieved by using a special cyclic procedure, and the light polarization produced during one short counting period was removed before the next began, so that the response could be determined under continuously unpolarized conditions.

The source of α-particles was polonium on the flat end of a platinum wire enclosed in a brass tube with a mica window of about 1 mg/sq cm thickness. The diamonds were fixed in their holders so that the same portion of diamond was tested for counting response after each bombardment. This was essential, as the counting properties of many diamonds vary from one region of the crystal to another. The temperature of the diamonds did not rise above 70 deg C, and the holders were not adversely affected. A flow of water helped in cooling. The effects of bombardment on the counting response of five small octahedral diamonds were studied in detail. In addition, two larger diamonds were bombarded in order to compare colour changes. Some of the irradiated diamonds were annealed at about 700 deg C for periods of up to 1 hour.

The counting pulse heights decreased progressively with increasing electron bombardment flux until after a total flux of 4×10^{16} electrons/sq cm they were barely detectable. Both counting and non-counting diamonds also become perceptibly bluish green after bombardment fluxes of this order. The collision model of damage gave a satisfactory interpretation of the general effects of bombardment, and differences between the intrinsic textural defects and those induced by bombardment can be attributed to the presence of interstitial carbon atoms after damage. However, the initial rapid decrease in pulse heights requires an additional disordering mechanism, and it is suggested that preferential damage in the vicinity of intrinsic aggregates of vacant sites may lead to partial graphitization of such regions. 5 illustr, 1 table.

A *C 3.25*

The preparation of single-crystal ingots of silicon by the pulling technique

E. Billig, D. B. Gasson (AEI Ltd, Aldermaston, Berks). *Journ Sci Instr* 1958 Vol 35 (10) pp 360-365 (Oct)

The construction and operation of a laboratory furnace for preparing monocrystals of silicon by the pulling technique are described. The design allows for close observation of the growth front of the ingot during its preparation. It has been found possible to assess the quality of high-grade silicon, and also to obtain an indication of the concentration of dominant impurities responsible for the measured resistivity, by comparison with computed distribution curves. 14 illustr, 3 ref. *W* *C 11.0*

Graphitization and plastic deformation of diamond

M. Seal. *Nature* (London) 1958 Vol 182 (4645) pp 1264-1267 (Nov 8)

A study was made of the thermally induced change of diamond into graphite. It was found that the change occurs via an intermediate structure of carbon atoms, and that plastic deformation of diamond can occur at 1,800 deg C under the stresses set up by an expanding nucleus of graphitization.

Two types of specimen were used: a fine powder of 0 to 1 micron particle size, and large single crystals up to a few millimetres across. The specimens were placed in hard pure graphite crucibles and heated in a vacuum of about 10^{-5} mm mercury in an electric resistance furnace to various temperatures for 15-30 minutes.

Diamond powder heated to 1,200 deg C showed little change, whereas it transformed completely to graphite at 2,000 deg Centigrade. At temperatures around 1,600 deg C, both diamond and graphite were present, together with spots due to neither and attributed to an intermediate arrangement of carbon atoms.

With large single crystals, the following sequence was observed after graphitization: (*i*) 1,200 deg C—slight dulling of surfaces; (*ii*) 1,400 deg C—definite grey colour; (*iii*) 1,500 deg C—diamond appears dark grey but still translucent; (*iv*) 1,800 deg C—diamond black, opaque, and starting to break up; and (*v*) 2,000 deg C—small black fragments.

Experimental techniques and results are discussed, with particular reference to the plastic deformation of the diamond. 8 illustr, 7 ref, 1 table.

W *C 2.22 : C 2.6*

Theory and use of the refractometer

Anon. *Loupe* 1958 Vol 8 (4) pp 1, 3-4 (July-Aug)

This is dealt with at a fairly elementary level, taking diamond as the theoretical specimen. 7 illustr.

W *D 15.2*

Research into diamonds and gold urged

Anon. *Gemmologist* 1958 Vol 27 (327) p 184 (Oct)

In his inaugural address at Witwatersrand Univ, Prof Logie called for more research into the properties of diamond and gold. He pointed out that certain types of diamond are suitable for use in Geiger counters.

W *C 1.2 : C 3.25*

Photograms of diamond crystals etched in a kimberlite melting

V. V. Nardov. *Zap Vses Mineralog Obshch* 1958 Vol 87 (5) pp 612-614 (In Russian)

12 illustr, 5 ref. *X* *C 2.5*

A matrix to correct for scintillator escape effects

E. G. Rawson, D. V. Cormack. *Nucleonics* 1958 Vol 16 (10) pp 92-97 (Oct)

4 illustr, 10 ref, 2 tables. *X* *C 3.25*

A simultaneous observation of Raman effect and fluorescence

P. P. Shorygin & coll. *Doklady Akad Nauk SSSR* 1958 Vol 121 (1) p 70; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 19 (Nov) (Original in Russian)

X *C 2.24*

Diamond

S. Tolansky. *Contact* 1958 Vol 2 (1) pp 29-31, 33-34 (Oct)

A discussion of the history of the diamond relates to the occurrence of the word diamond in the Bible. Old beliefs concerning diamond and its powers are recounted, and early methods of working the stone are described. *W* *C 0.1*

DIAMOND, ETC, IN INSTRUMENTS

An improved microtome

M. S. Sominskii. *Priroda* 1958 (3) p 73; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 121 (Nov) (Original in Russian)

X *C 3.26*

HARDNESS AND WEAR TESTING

A comparison of hardness testing with low-loads, using the Vickers and the Knoop methods. Vergleich zwischen den Haertepruefverfahren nach Vickers und nach Knoop im Kleinlastgebiet

R. Chatterjee-Fischer, O. Schaaber (Inst fuer Haertereitechnik, Bremen). *Industrieblatt* 1958 Vol 58 (10) pp HT80-HT82 (Oct) (In German)

The low-loads considered lie between 0.1 and 0.5 kg, and occasionally 1.0 kilogramme. One of the methods described as suitable for such loads is the Knoop method which uses a diamond pyramid to make the indentation. The Knoop diamond has a rhomboid shape, with angles of 172°30' and 130°, so that the ratio of the long and short diagonals is 7.11 : 1. Only the long diagonal is measured. The three advantages of the Knoop method are the smaller area of the indentation, the quicker measurement resulting from the necessity to measure only one diagonal, and the greater accuracy. This last factor is due to the length of the diagonal measured, which is 2.8 times that of the Vickers pyramid, as well as to the fact that only one measurement is taken into account.

In a test, a 3 mm thickness of sheet metal, C15, was used, which had been carburized in an activated salt bath at 900 deg C for 40 minutes, and then tempered in a hot bath at 180 deg Centigrade. The Knoop tests could be made far more closely in succession, owing to the short diagonal in one direction. The results are also compared with tests on a similar piece of tempered metal, which was kept in the salt bath for 80 minutes, and it is found that the hardness values found with the Vickers pyramid coincide with those found with the Knoop instrument, within the inaccuracy limits. The softer outer layer of the test piece is more clearly indicated by the Knoop than the Vickers method. From various measurements compared and averaged, it is concluded that the Knoop method has several advantages over the Vickers test.

A *C 4.0*

Method for measuring long-time hardness on a Rockwell tester for the purpose of determining creep of materials

Ya. E. Afanas'ev, A. I. Kolpashnikov. *Zavodsk Lab* 1958 Vol 24 (5) pp 627-629; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 185 (Sep) (Original in Russian)

X *C 4.0*

Research into the electrodeposition of copper. II. Microhardness and structure of electrolytic deposits of copper. Ricerche sulla elettrodeposizione del rame. II. Microdurezza e struttura di depositi elettrolitici de rame

H. M. Sammour. *La metallurgia italiana* 1958 Vol 13 (9) pp 397-401 (Sep) (In Italian)

For determining the microhardness of the copper specimen, to examine its influence on the microstructure, a Reichert hardness tester was used with a diamond pyramid indenter. 6 illustr, 5 ref.

M *C 4.0*

A study of the directional hardness in silicon

A. A. Giardini. *Am Mineralogist* 1958 Vol 43 (9-10) pp 957-969 (Sep-Oct)

The directional hardness of thin single crystal silicon was investigated by the peripheral grinding of oriented thin specimens, and by Knoop micro-indentations. Wafers, oriented within ±30 min of arc, were cut from the oriented boule with a precision diamond saw. A specially constructed diamond core drill was used to cut circular disks from the flat and parallel slices, the diametrical variation being less than ±0.5%. Two specimens were taken from each of the following three planes: (*i*) parallel to the [100] zone axis; (*ii*) parallel to the [110] zone axis; and (*iii*) parallel to the [111] zone axis. All disks were 0.165 ± 0.001 cm thick, and 1.05 ± 0.005 cm in diameter. Grinding was carried out under controlled conditions using a 240 mesh silicon carbide abrasive cloth. Hardness testing was carried out with the Bergsman 4-418 apparatus, using a Knoop point. Sources of error and results of both tests are shown. Experimental results are compared with published data on diamond. 4 illustr, 13 ref, 7 tables.

W *C 2.5 : C 4.0 : C 8.6*

Investigation of wear by electron diffraction

L. M. Niebylski, M. Antler (Ethyl Corp), L. O. Brockway (Michigan Univ). *ASLE Preprint* 1958 (58AM 3A-1) 30 pp (Annual Mtg Apr 23); *MIRA Mthly Summary of Automobile Engg Lit* 1958 p 34 (June)

Electron diffraction may be used in studies of friction and wear to indicate the chemical composition and physical state of the surface layers of a solid. When a mono-energetic beam of fast electrons is passed through or across a surface of a solid, coherent scattering (diffraction) will occur from an ordered structure, and a pattern which can be photographed will be produced by the diffracted electrons. Changes are interpreted that occur in the pattern through factors affecting the specimen surface.

Recent work on polished and Beilby layers indicates that a polished layer is a mixture of the metal and its oxide, with possibly adsorbed oxygen on the surface.

Research has been conducted on the determination of crystallite size from diffraction patterns, and the possible relations between wear and orientation of surface films. The use of electron diffraction is suggested for the study of solid lubricants. Reflection electron diffraction in conjunction with reflection electron microscopy has served to identify wear debris adhering to worn surfaces.

A *C 2.23 : D 15.7*

Microhardness testing, equipment, techniques, applications

V. E. Lysaght (Am Chain & Cable Co Inc). *Tool Eng* 1958 Vol 41 (4) pp 87-90 (Oct)

A very general description of microhardness testing and its applications. The microhardness tests are broadly divided into two categories: the scratch method and the indentation method. The varying loads and diamond indenters employed are described, as well as the methods of testing and reading of impressions. A table gives the Knoop hardness of electro-deposited metals at a 100 gramme load. 3 illustr, 1 table.

W *C 4.0*

An application of radioisotope wear study techniques

C. C. Gambill. *Gen Motors Engg Journ* 1958 pp 21-25 (Apr, May, June); *PERA Bull* 1958 Vol 11 (9) p 292 (Sep)

Describes with illustrations the measurement of wear on a compressor vane by irradiating the vane and sampling the oil. *X* *C 2.23 : D 15.0*

Device for measuring the wear of cutting tools

N. M. Ornis. *Stanki i Instr* 1958 Vol 29 (8) p 36 (In Russian)

2 illustr. *X* *D 15.0*

USP 2,839,917 (Oct 4, 1955) **R. A. Webster, Webster Instrument Inc**

Hardness testing machine

The machine indicates continuously both the applied load and the depth of indentation. Fig 1 shows

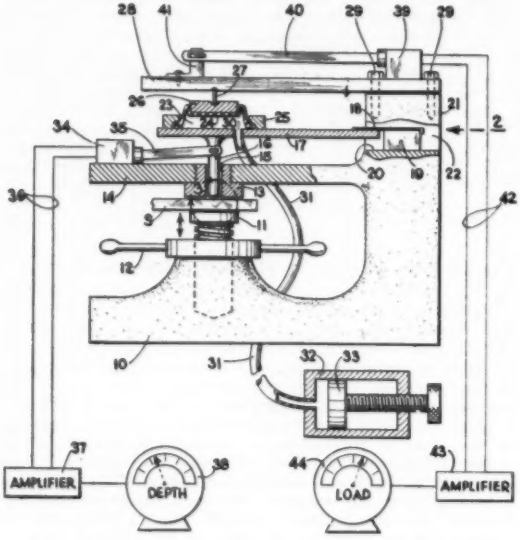

Fig 1. Diagram of hardness tester in testing position. USP 2,839,917.

specimen S on plate 11 to be raised by handle 12 against anvil insert 13. Indenter 16 is rigidly secured to support 17 flexibly held by leaf spring 18. The load is applied by pneumatic piston 33 through air chamber 23 with flexible diaphragm 24 transmitting pressure to bending beam 28. Transducer 39 and its actuating element 40 provide electric signals for indicating the bending and indenter load on meter 44. The movement of the indenter 16 into the specimen is taken up by the actuating element 35 coupled to the indenter, and varies the electrical output of transducer 34 passed on, amplified, to a meter 38 indicating the depth of indentation. (10 claims, 4 illustr). Ref cited : 4 USP ; 1 BP. *J* *C 4.01*

USP 2,842,960 **H. Schnadt**
(Sep 23, 1954—conv date, Switzerland)

Testing instruments with means for centering test bodies

Centring of specimens, *eg* for pendulum impact testing by special gauging devices, is time-consuming and especially awkward when large numbers of pieces are to be tested. A Schnadt type specimen provided with a transverse channel for a pin or bolt is arranged on supports against a stop and centered by tapering guide faces at the ends of a bar rotatably mounted on a spindle parallel to the pin or bolt, so that on turning the bar the guide faces touch the projecting end of the pin, shifting the specimen into correct position. The bar makes a half turn each time the spindle is moved by a hand lever through a rack and pinion device and a non-return clutch. (7 claims, 6 illustr). Ref cited : 4 USP. *J* *C 4.01*

USP 2,843,542 (Feb 23, 1956) **G. F. Callahan**

Method and apparatus for producing improved abrading contours

The method is to be used for producing hard sharp edges on cutting tools for machine tools as well as razor blades, for making stylus points, wire guides, for hardening micrometer anvils, spindle faces, etc, to exact dimensions. The method utilizes a controlled gaseous discharge to coat the cutting edge or work surface with an extremely hard or infrangible material, and then to shape the deposited material to the desired contour. The tool or part is initially pre-formed to approximately the desired dimension and then heated to the necessary deposition temperature by a positive ion bombardment of a gaseous discharge. The infrangible material is then coated on the cutting edge or work surface by vapour deposition and a positive ion bombardment of a gaseous discharge is then utilized to sputter the deposited material to the desired final contour. It is preferable to insulate those portions of the workpiece which can remain untreated by applying a coat of *eg* aluminium oxide to those parts so as to confine the gaseous discharge to the uninsulated portions only. As the infragible material boron may be used for *eg* carbon steel razor blades. As basic materials for the bodies in general, iron, steel, nickel, or alloys have been found suitable as easily pre-formed, while borides, carbides, and nitrides are suitable for the infrangible material. (8 claims, 17 illustr). Ref cited : 7 USP ; 1 Netherlands P. *J* *C 12.01*

TRUING OF GRINDING WHEELS

Single diamond dresses double wheel

Anon. *Grinding & Finishing* 1958 Vol 4 (5) p 38 (Sep)

A unit installed on a Thompson model C surface grinder enables aerofoil lugs on jet engine blades to be contour-ground two at a time to 0.0002 in., with only one diamond used to dress the double wheel. Truing accuracy is ensured by cam-control of the diamond, which keeps the point normal to the wheel face during the truing cycle. The diamond works from left to right and pivots on its axis so as to remain always at right angles to the face. Inside the truer is a hydraulically powered slide, mounting two templates : a contour template to control the diamond in and out of the wheel during traverse, and an angular position template to rotate the diamond. Action of a follower on the contour template is reduced to diamond movemen through a 10 : 1 inclined plane cam, which ensures 0.0002 in. repeat accuracy. A follower on the angular position template transmits motion to a rack and pinion assembly which simultaneously rotates the diamond. 1 illustr. *A* *C 5.0*

Grinding wheel truing apparatus. Schleifscheiben-Abrichtapparat

Anton Vogels Soehne AG, Pieterlen. *Technische Nachrichten* 1958 (147) p 9 (Oct) (In German)

This instrument is especially for precision work and combines the best points of all previously designed truing devices. It is fixed to the lathe in the T-slot, and can be adjusted to whatever position is required. 1 illustr. *A* *C 5.0*

Crush-truing speeds Hyatt toolmaking

F. Hegeman. *Machinery* (NY) Vol 65 (3) pp 129-132 (Nov)

The crush truing of silicon carbide wheels and the making of the master truers are described. 6 illustr. *W* *C 5.0*

Sharpening and truing grinding wheels. Das Schaerfen und Abrichten von Schleifscheiben

Anon. *Technica* 1958 Vol 7 (21) pp 1215-1219 (Oct 10) (In German)

(Cont). The geometry of truing a grinding wheel is examined. The well-known diamond grinding wheel truing tools can be classed into three groups similar to those of the three main truing methods. The first is a truing point fixed to the centre axle of the grinding wheel, the second is a point fixed a certain distance below the central line of the wheel; and the third is set up at an angle to the centreline of the wheel, the horizontal and perpendicular centreline being equally suitable. This type of equipment may also be used while the table of the machine, or the spindle head, is in motion. The disadvantage of setting the truing tool at an angle to the vertical centreline is that the tool comes too close to the wheel guard, but on the other hand greater manoeuvrability and control are afforded in this position. Equations are worked out from diagrams to find the distances and angles required in setting up diamond points for the three methods described.

The profiling of grinding threads on cog wheel grinding machines is discussed. The process is divided into four operations: rough profiling, the impregnation of the abrasive, truing with a diamond to form the thread, and finishing the outer diameter of the grinding thread on a lathe, all of which can be done on a gear grinding machine. A separate universal diamond truing attachment is used for the truing, which gives accurate and rapid truing of threads with entrance angles between 14°30' and 30° for old-fashioned and modern cog wheel profiles. A special machine for truing gears is also discussed.

Diamond grinding wheels must be carefully looked after, and used only for suitable substances. They should be re-sharpened as soon as they are blunt. Special silicon carbide dressing stones can be used for this purpose. Cleaning can be made easy and efficient by use of silicon carbide and water. It is important to use a coolant, applied evenly. (Concl). 21 illustr.

A *C 5.0 : D 8.0*

Operations on components for missile guiding equipment

F. A. Cuthbertson. *Machinery* (London) 1958 Vol 93 (2395) pp 818-823 (Oct 8)

One of the operations concerns truing ceramic and carbide wheels to provide cutting grooves in the required direction on both the periphery and face. A special machine equipped with a cup-shaped diamond wheel is used. Very fine cutting or shaving grooves are produced, inclined at an angle of 10 to 30° to the axis of the wheel. The ceramic wheel gives a surface finish of about 8 micro in., and the carbide wheel gives the required 1 micro-in. finish. 11 illustr.

A *C 5.0*

How to dress diamond wheels for best performance

J. W. Ripple. *Grinding and Finishing* 1958 Vol 3 (10) pp 32-34 (Feb); *Ind Diamond Rev* 1958 Vol 18 (214) pp 174, 176 (Sep)

A review of the dressing and cleaning methods for diamond wheels. In grinding with abrasive wheels there is a very close relationship between correct dressing and cleaning of the wheel face on the one hand, and cutting effectiveness and wheel life on the other. This relationship becomes even more apparent, in the case of diamond wheels, because of the high wheel costs involved. Because of the significant difference in the characteristics of each, distinctions are drawn according to the type of bond, *ie* vitrified, resin, or metal.

W *C 5.0*

USP 2,838,040 (Apr 30, 1956) **H. E. Balsiger, C. E. Tolbert, Landis Tool Co**

Dresser for multiple grinding wheels

This refers to a profile truing arrangement for multiple spaced wheels. The truing tool will true certain selected wheels as it traverses in one direction, and will true certain other selected wheels when it traverses in the opposite direction. The diamond holder is transversely slidable on a carriage moving lengthwise on a base along the wheels to be trued. A follower on the diamond holder is held in contact with a template when the carriage moves in one direction, but is separated from the template by electrically controlled means when the carriage moves in the opposite direction. The arrangement may also be used for machining operations on axially spaced workpieces using spaced cams and two limit switches which are rendered effective and ineffective by a third limit switch operable during the longitudinal carriage movement in one direction. (10 claims, 3 illustr). Ref cited: 3 USP.

J *C 5.0*

USP 2,841,928 (Dec 26, 1956) **D. A. Trescott, Super-Cut Inc**

Truing device for peripheral type grinding wheels

The device is primarily intended for use with peripheral type diamond grinding wheels. In such wheels only extremely small tolerances are permitted between the diamond matrix and the central mounting, as trueness and balance are essential for precision work. Trueness and balance are obtained by mounting the diamond wheel, which has a large central opening, between two clamping disks, one of which has a hub-like portion projecting into the wheel opening, and adjusting the position of the wheel by four conical screws between a ring in the central opening and the hub-like portion. The mounting is set with an adapter on the drive shaft. (10 claims, 4 illustr). Ref cited: 1 USP.

J *C 5.01*

USP 2,841,929 (Dec 26, 1956) **C. Stelmachowski, Super-Cut Inc**

Truing device for peripheral grinding wheels

Trueness and balance, which are of particular importance for the peripheral type diamond wheels, are obtained by clamping the grinding disk, which has a large opening, between two clamping rings, one of which has a hub-like portion projecting into the opening of the second clamping ring. Both disks are mounted on an adapter on the drive shaft, and the adjustment is effected by radial screws in the second clamping ring bearing against the outer face of the hub-like portion of the first clamping ring. (6 claims, 3 illustr). Ref cited: 5 USP.

J *C 5.01*

FINE BORING AND FINE TURNING OF METALS

Drilling with sintered carbide tools. Das Bohren mit Hartmetallwerkzeugen

H. Haidt. *Industrieblatt* 1958 Vol 58 (10) pp 419-424 (Oct) (In German)

Advice is given on spiral drills, and there is a short section on specially shaped drills, concerning the correct setting, type of work material, and the geometry of the tool. A special machine is recommended for grinding spiral bits so as to ensure the correct shape, the angle of the point and the slope towards the point being of particular importance. 13 illustr, 3 tables.

A *C 5.3 : C 6.0*

New methods in the construction of sinteerd carbide turning tools in order to make use of the natural properties of sintered carbide. Neue Wege bei der Konstruktion von Hartmetalldrehwerkzeugen zur wirtschaftlichen Ausnuetzung der natuerlichen Hartmetalleigenschaften

Anon. *Maschwelt & Elektrotechnik* 1958 Vol 13 (19/20) pp 379-380 (In German)

4 illustr. *A* *C 12.0*

Close tolerances with diamond tools . . . and standard lathes

Anon. *Am Machinist* 1958 Vol 102 (20) p 109 (Sep 22)

A saving of $35,000/yr has been effected by tooling two Cincinnati toolroom lathes with diamond tools. The tools finish rotogravure rolls to a tolerance of 0.0002 in., and eliminate three grinding and honing operations. 1 illustr. *W* *C 6.0*

Machining titanium and its alloys

G. W. Baver. *Tooling* 1958 Vol 12 (11) pp 43-46 (Nov)

Basic recommendations are given for the machining of titanium and its alloys. Recommendations include machining speeds and tool angles. 3 tables. *W* *C 12.9*

Threading today with throwaways

R. P. Carr. *Carbide Engg* 1958 Vol 10 (10) pp 20-21, 23 (Oct)

Types of tool available and methods of use are reviewed. Modifications to existing toolholders are suggested. 5 illustr, 1 table. *W* *C 5.0*

New design of cutting tools

G. N. Chernavskii. *Vestnik Mash* 1958 Vol 38 (7) p 59; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 191 (Nov) (Original in Russian)

X *C 6.2*

Thread grinding machine for small parts

Cosa Corp, 405 Lexington Ave, New York 17, NY. *Grinding & Finishing* 1958 Vol 4 (6) p 58 (Oct)

The Reishauer RAG high precision thread grinder uses single-rib grinding wheels with longitudinal feed. The maximum grinding length is 9½ in., the distance between centres is 20 in., and the minimum-maximum workpiece diameter is 0.04 to 0.75 inch. The electric truing device has two heads which operate independently but simultaneously. Also available is an electric truing device using one diamond tool which oscillates along both flanks and which describes a radius if required. 1 illustr. *W* *C 5.0*

Cemented [sintered] carbide turning tools

A. G. Gardner. *Mech World* 1958 pp 308-313; *PERA Bull* 1958 Vol 11 (9) p 294 (Sep)

A general review of design fixtures and machining conditions. *X* *C 12.2*

Investigating deformations caused by metal cutting

V. A. Krivoukhov, P. D. Bespakhotnyi. *Izv vys ucheb zav; mashinostr* 1958 (1) pp 94-105; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1851 (Sep) (Original in Russian)

X *C 6.5*

Device for determining deformation zones in metal cutting

B. G. Levin. *Vestnik Mash* 1958 Vol 38 (7) p 63; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 191 (Nov) (Original in Russian)

X *C 6.5*

More knowledge of cutting tool geometry needed

S. W. Lovejoy. *Canad Metalworking* 1958 Vol 21 pp 8-11 (July); *Battelle Techn Rev—Abstr* 1958 Vol 7 (10) p 690a (Oct) (No 13700)

Nomenclature and grinding angles are defined for single point tools, and the purposes of the various relief and clearance profiles are explained. *X* *C 6.2*

Turning alloy steels with ceramic and carbide tools

Production Engg Research Assoc, Melton Mowbray, Leics. *PERA Rep* No 61 1958 16 pp (Sep)

Results are given of tests carried out to determine and compare the performance, in terms of tool life and surface finish, of various 'clamped on' ceramic and carbide tips when turning 45 to 65 ton/sq in. UTS alloy steels. Full details of test conditions and tool geometry are given. 20 illustr. *W* *C 12.9*

Metal-cutting tests : the input-output approach

D. N. Smith. *Tool Eng* 1958 Vol 41 (4) pp 103-104 (Oct)

1 illustr. *X* *C 6.5*

Ultrahigh speed machining . . . solution to producibility problems ?

R. L. Vaughn (Lockheed Aircraft Corp, Burbank, Calif). *Tool Eng* 1958 Vol 41 (4) pp 71-76 (Oct)

The advances made in high-speed machining research are described in relation to the problem of machining hardenable steels and titanium alloys at speeds comparable to those used in conventional aluminium spar milling, skin milling, and profiling. 7 illustr. *W* *C 12.9*

CUTTING AND MACHINING OF GLASS

The Autoflow 'Auto-Twin' glazing machine

Autoflow Engg Ltd. *Mfg Opt* 1958 Vol 12 (1) p 25 (Oct)

The Auto-Twin is an automatic vee-edging machine for use with modern lens shapes, particularly deep torics. The lens is set up on a sucker pad with the aid of a sighting jig, and transferred to the machine carriage where it is retained by spring pressure. The former of steel or plastic is pressed into position and diamond grinding takes place along accepted lines which are, however, slightly modified. The diamond wheels are available in three forms: 6 × ¼ in., 2 off 6 × ¼ in. matched pair, or 6 × ½ inch. The lens carriage is transferred to a position over an Aloxite wheel where, owing to the fine finish produced by the diamond wheel, only a minimum of work is necessary. The Aloxite wheels are trued by a new design of set-diamond truer. 1 illustr. *W* *C 7.23*

New universal edger . . . the Electro-V-Matic

Pad Specs Ltd, Solihull, Warwicks. *Mfg Opt* 1958 Vol 12 (1) p 33 (Oct)

The Electro-V-Matic universal edger is designed for producing a finished lens of either bevel form or flat edged for rimless mounts, from an uncut lens. The uncut lens is mounted in the work head and brought into contact with the diamond roughing wheel which reduces it to the required shape and size. The head automatically retracts at the end of the time cycle, and the lens is placed in contact with whatever finer mesh wheel is required. The head again retracts automatically when the work is completed. It is not necessary to re-set the size between diamond wheel and final wheel stages. 1 illustr. *W* *C 7.232*

An ingenious adaptation

Precision Optical Products. *Ind Diamond Rev* 1958 Vol 18 (212) pp 135-136 (July)

The adaptation of the Wolf heavy-duty valve refacer for use as a lens edging machine is described. 1 illustr.

W *C 7.232*

Designing processes for assembly-line grinding and polishing of sheet glass

B. S. Temkin. *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1815 (Sep) (Original in Russian)

Book, Gos izd-vo lit-ry po stroit, materialam, Moscow. 1957, 61 pp. [Not in library of Ind Diamond Inf Bur].

X *C 7.23*

MACHINING OF STONE, ETC

Slicing and dicing crystals of silicon and germanium

Anon. *Machinery* (NY) 1958 Vol 65 (2) pp 128-130 (Oct)

Mass production of transistor elements from silicon and germanium crystals is achieved on modified DoAll surface grinders. These have been adapted to take a 6 in. diameter diamond wheel for slicing, and 40 × 3 in. diameter wheels on a single arbor for dicing. The diamond wheels required for these operations had to be thin owing to the amount of crystal lost in the sawing operations. With a diamond wheel 0.008 in. thick, the silicon loss in the form of dust is about 65%. The wheels had to have a periphery of evenly distributed diamond in order to reduce scratching and unevenness on the diced parts. Diatronic wheels, made by Navan Products Inc, were found to be suitable ; they are 0.006 in. thick, with a thickness accuracy of +0.005 in. −0.0000 inch. Dust losses with these blades are reduced to 45%. A detergent coolant is recommended. 5 illustr.

W *C 8.6*

Precise methods make transistor elements

C. Emerson. *Metalworking Prodn* 1958 Vol 102 (41) pp 1789-1790 (Oct 10)

Improved methods of cutting include slicing thin wafers from a single-crystal ingot with diamond saws, dicing the wafers into tiny squares with single or ganged saws, lapping and polishing the faces of the wafers and dice to a high accuracy, and the ultrasonic machining of faces to special shapes. Because of the small size and brittleness of the ingots, slicing and dicing saws must operate at high peripheral speeds (4,500 ft/min) and slow feeds (down to ¼ in./minute).

Each single crystal ingot is examined by x-ray in order to align it when cemented to the glass plate for slicing. The ingot is 3 to 4 in. long and ¼ to 1 in. in diameter ; it is cut to slices as thin as 0.020 in. by a metal wheel loaded with diamond grit. The saw is usually 0.035 in. thick. After slicing, the wafers are lapped on round steel plates to 0.001 in. accuracy, and usually finished on a standard optical or industrial lapping machine. Aluminium oxide or diamond dust abrasive is applied by silk- or nylon-covered lapping disks. The wafers are reduced sometimes to 0.00137 in. thickness, or more often 0.003 to 0.004 in., with tolerences of 0.0002 in.

When wafers are to be diced by saw, they are remounted and covered with another layer of wax and a thin laboratory specimen of glass to prevent edge chipping. Dicing is done with wire-mesh diamond saws, singly or in gangs, to produce rectangles or squares as small as 1/16 in. square. Ultrasonic techniques are also used to cut wafers into small dice. 3 illustr.

A *C 12.61*

New Zealand revives greenstone carving

Anon. *Irish News & Belfast Morning News* 1958 (28218) p 2 (Oct 7)

The craft of greenstone carving has been revived in New Zealand. Formerly carried out by the Maoris with sand and water, the modern processing techniques use diamond drills and grinding wheels.

W *C 8.0*

Germanium slicing machine

Bunter SA, Lucens, Switzerland. *Ind Diamond Rev* 1958 Vol 18 (212) p 130 (July)

The machine uses diamond blades from 0.20 to 0.30 mm thick for sawing germanium and similar crystals. 1 illustr.

W *C 8.6*

How to machine glass base laminated plastic

E. C. Graesser (Nat Vulcanized Fibre Co, Wilmington, Delaware). *Tooling & Prodn* 1958 Vol 24 (7) pp 56-58 (Oct)

A 12 in. diameter diamond-impregnated copper wheel run at 3,000 to 3,600 rev/min and run dry is recommended for sawing. Diamond band saw blades are now available and are superior to the conventional steel ones. Carbide-tipped tools are suitable for most of the machining operations. 6 illustr.

A *C 7.0*

Automatic miller for slicing crystals

Robert E. Morris Co, West Hartford 7, Conn. *Mod Machine Shop* 1958 Vol 31 (5) p 178 (Oct)

The Nichols 8SA special automatic miller uses a diamond-impregnated cutting disk, 5 in. diameter by 0.015 in. thick, rotating at 7,000 rev/min, for slicing germanium into 0.013 in. thick wafers. 1 illustr.

W *C 8.6*

USP 2,838,041 (Feb 17, 1956) **M. Rovis**
Marble cutting and finishing machine

Straight and circular cutting, profiling, polishing, and drilling operations which hitherto required a number of special machines with frequent transfer of the workpiece, can be carried out on a single machine structure with a stationary platform having a central opening for a rotary platform which may be raised or lowered as desired, and which serves as a support for the stone slab. The cutting means are selectively positioned on either or both platforms. A marble finishing wheel arranged on a supporting arm mounted on a vertical post to be swung in position through an angle of 360° can be located at any point on the platform. The whole assembly may be adjusted and manually moved where needed. (14 claims, 4 illustr). Ref cited : 10 USP ; 1 GP.

J *C 8.01*

GEM POLISHING

Polishing diamond

F. P. Bowden. *Gemmologist* 1958 Vol 27 (322) pp 86-90 (May)

An extract from the article entitled 'Adhesion and Friction' which appeared in *Endeavour*, 1957. See *Bibl Ind Diamond Appl* 1957 Vol 14 p B78 (May).

5 illustr, 1 ref.

W *C 2.23 : D 4.0*

LITERATURE REQUESTS
When applying for the loan of literature abstracted in this journal, please quote the title of the article, the name of the author, and the number of the page on which it appeared.

Goldsmith and gem polishing work. Goldschmied und Edelsteinschleifarbeit

Anon. *Dtsch Goldschmiedezeit* 1958 Vol 56 (10) p 592 (Oct) (In German)

The amateur gem polishing activity in America has brought about the introduction of small gem polishing and cutting machines. Some combine four wheels, *ie* two of carborundum and one each of felt and wood, in the one machine. Others have interchangeable wheels, diamond saws, a water lead, and a clamp for holding the stones. This type can be used for faceted stones of 8 × 10 or at the most 12 × 14 mm. Polishing pastes and other equipment are supplied. In Germany there are no such instruments known to the writer of the article. 3 illustr. *A* *D 4.0*

Lapidary attachment

Bunter SA, Lucens, Switzerland. *Ind Diamond Rev* 1958 Vol 18 (214) p 178 (Sep)

The attachment fits conventional diamond polishing machines, and is designed for producing diamonds for tools with radii of 0.1 to 6.00 mm. 1 illustr.
W *D 4.0*

ROCK DRILLING

Looking back on the German Industrial Fair at Hanover. Rueckschau auf die Deutsche Industrie-Messe Hannover

Anon. *Glueckauf* 1958 Vol 94 (33/34) pp 1102-1127 (Aug 16)

Many different machines for use in mining are described. The section on deep drilling instruments includes diamond drilling bits by Salzgitter Maschinen AG, Salzgitter-Bad, and others by J. C. Soeding & Halback, Hagen. Christensen Diamond Products GmbH showed turbine drill bits and drill crowns, both diamond-impregnated, and Ernst Winter & Sohn showed diamond reamers for every type of rock. One of their diamond bits, 8½ in. diameter, was fixed in the Salzgitter turbine and obtained 25 m drilling/hour in the quartz diabase. The display of Joh Urbanek & Co, Frankfurt and Nuremberg, included diamond drill crowns, including the Truco oil drilling crown 6¼ × 3¼ in. 45 illustr. *A* *B 14.2 : C 9.21*

Diamond drill exploration for chromite at Byrapur, Mysore State, India

B. P. Radhakrishna. *Bull Mysore Geol Ass* 1958 (16) p 24 ; *Bibl Sci Publ S & SE Asia* 1958 Vol 4 (9) col 248 (Sep)
X *C 9.0*

Two rock drill units for hole boring

B. A. Zakhvatkin, P. A. Samoilov. *Biul TSNIICHM* 1958 (7) pp 31-32 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1896 (Sep) (Original in Russian)
X *C 9.2*

How to get more output from your rotary drill

P. C. Ziemke. *Rock Prod* 1958 Vol 61 (8) pp 96, 98, 100, 120

The drills in question are of steel or sintered carbide, and the general theory of drilling is discussed with particular emphasis on correct angle of drill to rock, correct speeds, pressures, et cetera. The formation of chips is also examined. 2 illustr.
A *C 9.2*

Iron ore and other raw material sources for a primary iron and steel industry in Western Canada

T. H. Jones. *Canad Min & Metall Bull* 1958 Vol 51 (557) pp 564-572 (Sep)

The different deposits or iron-ore, taconite, sulphide, beach sand, and limestone in Canada are reviewed, and the state reached in mining development is discussed. Much of the exploratory drilling is done with diamond, especially the deeper testing. The Empire Development Co have extensive favourable grounds remaining to be tested by diamond drilling, and the Argonaut Mine Division of the Utah Company of the Americas is producing iron ore concentrates near Upper Quinsam Lake following extensive diamond drilling prior to 1951. Other important deposits have also been opened up after testing diamond drill cores, and in several places there still remains considerable exploration to be carried out by similar methods. 1 illustr, 20 ref, 3 tables. *A* *C 9.0 : C 9.21*

Rotary drilling and sampling

E. P. Chapman jun. *Mining Congr Journ* 1958 Vol 44 (9) pp 50-53 (Sep)

Modern developments in drilling equipment are reviewed. The significant developments mentioned are the wire-line diamond drill which permits removal of the core barrel while drill rods and bit remain in the hole, miniature drills easily transported by air, truck- and track-mounted churn and wagon drills, combined rotary/percussion systems, improvements in bit and core barrel design, and superior alloys. 5 illustr.
A *C 9.0*

USP 2,838,284 (Apr 19, 1956) **B. L. Austin, Christensen Diamond Products Co**

Rotary drill bit

A large circulating area is available through the bit at its central portion for flushing the cuttings from the hole and for cooling. A generally conical shape is produced in the bottom of the hole while no central core is produced as the cutting elements extend adjacent to the axis of rotation. Fig 2*a* shows diamonds

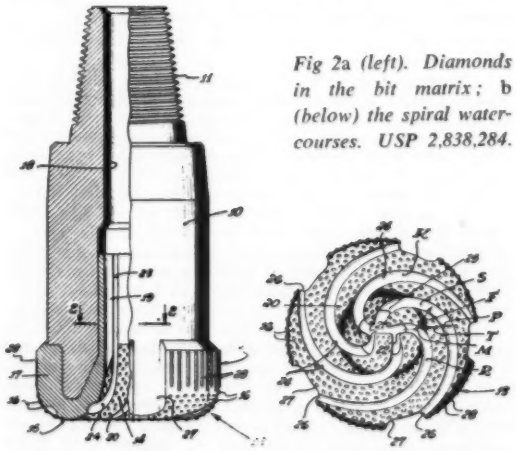

Fig 2a (left). Diamonds in the bit matrix ; b (below) the spiral watercourses. USP 2,838,284.

16 embedded in matrix 17 in faces 13, 14 and 15 of the bit. Reaming face 13 ensures the proper cylindrical dimensions, and central conical face 14 assists in centring the bit. Fig 2*b* shows the spiral watercourses 24 leading to slots 27 in reaming face 13. A pressure differential between points M and P will cause fluid to flow in the direction of arrow T. (15 claims, 5 illustr). Ref cited : 3 USP ; 1 FP. *J* *C 9.01*

USP 2,838,286 (Apr 19, 1956) **B. L. Austin, Christensen Diamond Products Co**

Rotary drill bit

The diamond concentration on the cutting face is substantially uniform between the spiral watercourses per unit of projected area, as shown in Fig 3*a* which is

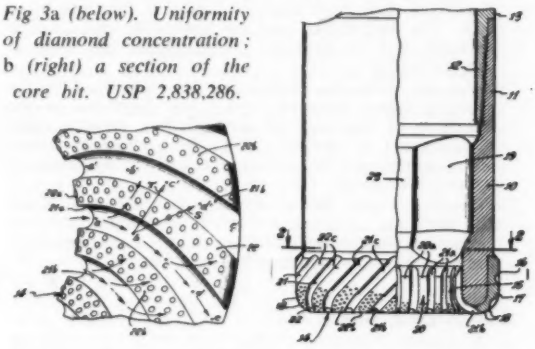

Fig 3a (below). Uniformity of diamond concentration; b (right) a section of the core bit. USP 2,838,286.

a fragmentary bottom view of the core bit, Fig 3*b*. The shape of the watercourses is such that the fluid does not flow only through the courses themselves but also across the diamond-studded lands, as the pressure will decrease progressively along the length of each watercourse and fluid tends to flow along a straight line path thus travelling from one watercourse to the next watercourse to a portion of less pressure, thereby effectively cleaning and cooling the cutting parts of the bit. (8 claims, 5 illustr). Ref cited: 3 USP; 1 FP.

J *C 9.01*

USP 2,842,343 (Nov 19, 1954) **W. L. Church, C. E. Church**

Retractible bit

Diamond studded cutting segments are attached to yieldable legs which are urged outwards by the lowering of a core taking device through the casing to the bottom of the hole. When it is desired to raise the bit, the core taking device is lifted and breaks the core, the legs move inwards, and a fishing tool may then be employed to engage the bit and remove it from the tubing. (3 claims, 6 illustr). Ref cited: 5 USP.

J *C 9.01*

WIRE DRAWING

Progress in wire drawing

Anon. *Mech World* etc 1958 Vol 138 (3472) pp 498-504 (Nov)

A survey of wire drawing, especially dies, lubrication, and heat treatment of the wire. A section of the article relates to diamond dies.

Diamond dies are principally used on wires below 0.10 in., but, where accuracy of diameter is not of great importance, carbide dies can be used down to 0.03 inch. The life of a diamond die is 2½ times that of a carbide die. The use of diamond as a gauge stone on carbide die drawing machines is mentioned, and the geometry of diamond dies is discussed. Other sections deal with ferrous wire, die construction, drawing speeds, drawing machines, and heat treatment. 16 illustr, 3 ref.

W *C 11.0*

Electrical diamond die drilling

Anon. *Wire Ind* 1958 Vol 25 (298) pp 963, 977 (Oct)

The diamond is mounted on a brass block and the primary cone drilled by means of high-voltage sparks formed at the point of a needle, 0.02 in. in diameter, in contact with the diamond. The secondary cone is formed by applying a low-voltage discharge to the diamond which is mounted on an insulating post in a dish of electrolyte; the electrolyte should just cover the diamond. The ten operations involved, following the 'squaring' of two sides of the diamond and the making of a window are: (*i*) spotting, to form a cone 0.014 to 0.020 in. deep, by high voltage drilling; (*ii*) 30 to 40 minutes mechanical drilling with diamond powder; (*iii*) repetition of high voltage drilling; (*iv*) mechanical coning; (*v*) final fore-drilling which should bring the bottom of the cone to within 0.006 and 0.008 in. of the back surface of the diamond; (*vi*) final primary coning to produce a cone diameter of 0.002 to 0.003 in., immediately above its apex; (*vii*) electrolytic drilling of secondary cone, using a 5% aqueous solution of sodium chloride; (*viii*) drilling the main body of the secondary cone with potassium nitrate; (*ix*) countersinking of sharp edge; and (*x*) mechanical finishing and polishing. 1 illustr.

W *D 11.4*

Pressure lubrication of wire drawing dies—a practical application

A. V. Hedman. *Wire & Wire Products* 1958 Vol 33 (10) pp 1205, 1271 (Oct)

Paper to the Annl Covention of the Wire Assoc, Atlantic City, NJ, Oct 15, 1958.

A description of pressurized die holders for use with tungsten carbide dies. Die life is reported to be increased by 20%. 3 illustr.

W *C 11.0*

GRINDING AND POLISHING OF HARD METALS

BSA centreless grinding ball pins

Anon. *BSA Tools Group Journ* 1958 Vol 3 (11) pp 4-7 (July-Sep)

Two types of 'ball pin' component can be ground on the BSA No 8 centreless grinder: the full sphere and the half sphere. The ball and taper portions are ground simultaneously, and a special radius truing attachment allows one diamond to true both the ball and taper sections of the grinding wheel. Truing of the taper section is controlled from a conventional former, and a special adjustable slide stop arrangement arrests the diamond slide at the end of the taper truing operation. The radius truing quill is then rotated to true the radius portion of the wheel. Stops permit control of the rotation of the quill through the required number of degrees, and it can be stopped in a pre-set position. The initial position of the diamond holder in the quill is obtained with a diamond setting gauge.

The operation of the machine is described. 8 illustr.

W *C 5.3*

Grinder-miller

Anon. *Instr Rev* 1958 Vol 5 (58) p 967 (Oct 28)

This portable grinder-miller can deal with tungtsen carbide mills up to ¼ in. diameter and 1 in. cutting edge, grinding wheels up to 1¼ in. diameter and ¼ in. width, and tool shanks up to ½ in. diameter. The precision finishing of the machine's components is claimed to eliminate vibration. 1 illustr.

F *C 12.21*

Machines and tools in the Vienna Autumn Fair, 1958. Maschinen und Werkzeuge auf der Wiener Herbstmesse 1958

K. Pawlowitz. *Maschwelt & Elektrotechnik* 1958 Vol 13 (19/20) pp 363-372 (In German)

One section covers grinding machines from Belgium and E Germany. 18 illustr. *A* *C 5.0*

Power quills speed output at lower cost

B. C. Brosheer. *Metalworking Prodn* 1958 Vol 102 (41) pp 1781-1783 (Oct 10)

Power quills are extremely versatile. They can be held in any position in fixed or adjustable mounts, used as supplementary spindles to perform additional operations on a conventional machine tool, or as power sources for machining on special jigs and fixtures. Various applications are described, including a multi-unit set-up in which two opposed horizontally mounted 45,000 rev/min, ¼ hp quills are mounted at the end of a home-made milling machine, which mills two sides of 6 ft long rocket launcher parts. Two-flute 3/16 in. diameter carbide end mills are used, and the stock removal is 0.05 in. during the 15 second cutting cycle. 7 illustr.
A *C 6.0*

Microhoning of outboard conn rods eliminates 3 operations . . . booms productivity rate 23 times

Evinrude Motors, Milwaukee. *Cross-Hatch* 1958 Vol 10 (2) pp 2-3 (July-Aug)

The introduction of Microhoning with diamond in manufacturing connecting rods has raised production from 300 rods in 40 hours to 7,000 rods in 40 hours for each man. The rejection rate is now only 0.3%. The increased production rate is due to the elimination of three stages formerly required : remilling the locating face on the wrist pin end, the straightening operation after rough boring, and the milling of a groove for oil holes in the wrist pin bore. All this is made possible by the 'float' principle and the cross-hatch surface lay pattern.

Microhoning's low-velocity abrading technique, with its distribution of efficient cutting action over a wide area, and its low pressure/abrasive grain, produces a surface which is free of burned or smeared metal. The small amount of heat generated is widely dispersed. 3 illustr. *A* *C 13.3*

Film proves abrasive wheels cut chips

Anon. *Am Machinist* 1958 Vol 102 (21) p 85 (Oct 6)

High-speed photography techniques have been used to study the cutting action of abrasive wheels. It has been proved that the cutting action is discontinuous and that chips are produced. Vibration appears to be one of the major causes of the interrupted cutting action, and another cause appears to be the random distribution of the abrasive particles. 2 illustr.
W *C 5.5*

Questions and Answers

Anon. *Grinding & Finishing* 1958 Vol 4 (5) p 59 (Sep)

Answer to a reader's question on wet *v* dry grinding. Wheel truing or dressing with a diamond point should always be performed with a generous flow of coolant directed to the point of contact. This flow will cause diamond fracture if applied after grinding has started, when the diamond is hot. In dry truing, expansion of the diamond nib is often sufficient to produce an objectionable taper on the wheel face and a corresponding taper in the cylindrically ground work. The use of a coolant during the wheel dressing or truing operation prolongs the diamond life and eliminates flying abrasive and bond particles.
A *C 5.0*

Developments on gear grinding machines

L. Martinaglia (Maag Gear-Wheel Co Ltd). *Metalworking Prodn* 1958 Vol 102 (41) pp 1776-1780 (Oct 10)

All new Maag machines are now equipped for grinding according to the 0° method, in contrast to the conventional 15° method. The two grinding wheels are arranged parallel to each other, and grind the tooth flank with their inner edges no longer in the same tooth gap. The feed stroke and the generating path can be reduced, and the grinding plane touches the tooth at one point only.

The two correction movements are performed by the grinding wheel supports, which are displaced in the direction of the axis of the grinding wheels. This displacement is derived from the correction heads, which contain a set of adjustable cams for the shape of tip and root relief.

Details are provided concerning the correction heads and their use. The correction of tooth form, the best conditions for fatigue resistance, and the sharpening of the shaving tools are described. 10 illustr.
A *C 5.0*

How to grind carbide dies

D. E. Oberg. *Grinding & Finishing* 1957 Vol 3 (6) pp 34-37 (Oct) ; *Ind Diamond Rev* 1958 Vol 18 (211) pp 116, 118 (June) ; (212) pp 132-135 (July)

Grinders with peripheral type wheels, which provide good visibility, are recommended. A sulphur-free coolant will extend diamond wheel life. An ideal combination of wheels would be a 100 mesh wheel for roughing and a 180 mesh wheel for the final 0.001 to 0.002 in. of cut. A 150 mesh wheel is suitable as a general purpose wheel. The wheels should have an 'R' bond hardness, a diamond concentration of 100, a resinoid bond, and a ¼ in. depth of diamond section.

Information is given on speeds and wheel widths, wheel adjustment, dressing, die preparation, grinding, and cleaning and re-assembly. 7 illustr.
W *C 5.0 : D 8.0*

Tool grinding

Anon. *Machine Tool Rev* 1958 Vol 46 (275) pp 117-121 (Sep-Oct)

Illustrated descriptions are given of the following tool grinders : (*i*) the Lumsden 30R four-wheel Ardoloy tool grinder ; (*ii*) the Edgwick tool and cutter grinder ; (*iii*) the Heald No 3 tool sharpener, which has a diamond wheel on each end of the main spindle ; (*iv*) the De Vlieg Micro-point grinder, particularly suitable for stylus grinding ; (*v*) the Edgwick automatic face cutter grinder ; and (*vi*) the Edgwick Ardoloy lapping machine for hard metal tools. 13 illustr.
W *C 5.3*

Beacon Type CT.8 grinding and lapping machine for carbide tools

Beacon Machine Tools Ltd, Hurst Lane, Tipton, Staffs. *Machinery* (London) 1958 Vol 93 (2396) p 899 (Oct 15)

Carbide-tipped tools up to 2 in. thick can be ground and lapped on the CT8. Vitrified abrasive and diamond-impregnated wheels, 8 in. in diameter, can be mounted on both ends of the spindle which runs in adjustable roller bearings. The spindle speed of 2,600 rev/min is obtained through a v-belt and pulleys from a 1½ hp reversing motor. The 8½ × 16 in. tables can be adjusted from 10° above to 30° below the horizontal. 1 illustr.
W *C 12.21 : C 13.2*

Automatic measurement of shaft diameters during the process of grinding

Ya. I. Kagan & coll. *Vestnik Mash* 1958 Vol 38 (10) p 58 (In Russian)

W *C 5.0*

The use and evaluation of metallographic techniques on different materials. Die Anwendung und Auswertung von metallographischen Verfahrenstechniken an verschiedenen Werkstoffen

W. Strohfeld. *Industrieblatt* 1958 Vol 58 (10) pp 442-446 (Oct) (In German)

One of the processes described is the method of diamond polishing with special machines. Polishing with diamond pastes is widely applicable to many metals and is indispensible for sintered carbides and soft metals, as the sharp-edged diamond particles ensure a smooth finish. The times for ceramic, diamond, and electro-polishing processes on various materials are shown. With a diamond paste, the time taken is 2 to 3 min, and the electropolishing 45-90 sec on the hardest material, AlSi. The disk used is of resin, covered with a thin cloth, on which is spread 2 cub cm of diamond paste, 2.5 to 5 cm away from the disk centre ; it revolves at a rate of 125 or 250 rev/minute. During the operation the disk is moistened with a few drops of denatured alcohol, but, if too much is added, cracks occur in polishing.

Diamond polishing can supplement electropolishing as a finishing process. After 10 to 20 sec of electropolishing, 30 sec to 1 min of diamond polishing suffices. If a fine mesh of diamond paste is used it will finish the surface, but if a coarser mesh is used a ceramic will be suitable for the finish polishing. 6 illustr, 27 ref, 3 tables. *A* *C 12.9 : C 13.0*

Care and maintenance of tools : grinding twist drills and cutting dies. Pflege und Instandhaltung der Werkzeuge Fortsetzung : Schleifen von Gewindebohrern und Schneideisen

Anon. *Technik & Betrieb* 1958 Vol 10 (10) yellow insert page (Oct) (In German)

(Cont). The basic rules to be observed with respect to correct angle of tool and workpiece, etc, are outlined. 4 illustr. *A* *C 6.0*

Abrasive wheelhead suspension

L. J. H. Ballinger Ltd, Station Rd, Woodchester, Stroud, Glos. *Machinery Lloyd* 1958 Vol 30 (22A) pp 65-66 (Nov 1)

A new swing-arm wheelhead has been developed in order to provide a certain amount of 'give' when working with diamond and other cut-off wheels. The wheelhead yields to the shape of the wheel and compensates for non-concentricity.
W *C 5.3*

Blanchard surface grinders

Blanchard Machine Co, Cambridge 39, Mass. *BSA Tools Group Journ* 1958 Vol 3 (11) pp 20-24 (July-Sep)

A review of the following models : the No 18, 16A, 16A2, 22A, and the 11. Information covers capacity, chuck, wheel, speeds, and feed. 6 illustr.
W *C 5.3*

Instruments for checking parts during grinding

G. V. Khokhlova. *Avt prom* 1958 (4) pp 28-30 (Apr) : *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1815 (Sep) (Original in Russian)
X *D 15.0*

Better metallographic techniques . . . . polishing by vibration

E. L. Long, R. J. Gray. *Met Prog* 1958 Vol 74 (4) pp 145-148 (Oct)

The vibratory polishing equipment, which can accommodate from 1 to 24 specimens, is described. Greatly increased speeds are employed. 5 illustr.
W *C 12.9*

Diamond hones used on soft state forging

Diagrit Ltd. *Ind Diamond Rev* 1958 Vol 18 (214) pp 176-177 (Sep)

The diamond honing of diesel engine rocker-arms was accomplished by the use of two Hydrohoners using Diagrit hones. On the larger bore, grit hones had previously lasted for 70 bores ; the diamond hones lasted for 5,500 bores. On smaller bores, grit stones had lasted for approximately 100, whereas diamond hones lasted for 7,500. 1 illustr.
W *C 13.3*

Technological possibilities of increasing the efficiency of gear grinding machines

V. P. Ershov. *Stanki i Instr* 1958 Vol 29 (8) pp 7-9 (In Russian)

5 illustr. *X* *C 12.3*

Rough grinding with silicon carbide wheels

R. A. Parke (Norton Co, Worcester, Mass). *Carbide Engg* 1958 Vol 10 (10) pp 16-18 (Oct)

Nine recommendations on grinding with silicon carbide wheels. 3 illustr. *W* *D 14.1*

Select grinding wheels to produce minimum stress

J. A. Mueller. *Am Machinist* 1958 Vol 102 (20) pp 93-95 (Sep 22)

Following an analysis of stresses produced in grinding, the following three points are emphasized : (*i*) soft wheels produce a minimum of residue stress ; (*ii*) harder wheels mean longer wheel life and higher abrasive efficiency, together with a drop in the quality of the grind ; and (*iii*) the end product governs the choice of grinding wheel. 6 illustr. *W* *C 12.0*

A study of electrically aided grinding

M. M. Patterson. *Grinding & Finishing* 1958 Vol 4 (6) pp 24-27 (Oct)

The AIT Diamond Tool Co tested 40 diamond wheels on an Anocut electrolytic grinder, a Hammond SCE-6 fully automatic grinder, and a Wendt-Sonis Econo-Grind unit. As a result of these tests, which are described, the E-2 diamond wheel was developed for electrolytic grinding, and the EA-2 for electrolytically assisted grinding. Wheel dressing by de-plating is briefly described, and graphs show the influence of coolant on diamond wheel wear. 7 illustr.
W *C 5.0 : C 12.9 : D 8.0*

International conference on gearing . . . Some bevel gear-cutting machines

F. Pohl. *Metalworking Prodn* 1958 Vol 102 (42) pp 1825-1827 (Oct 17)

Extracts of a paper describing the system of hobbing spiral bevel gears employed on the machines built by Klingelnberg & Sons give details of machines designed for these and other types of bevel gears. 4 illustr.
W *C 6.0*

Cutting a star

R. N. Perry (Norton Co). *Grinding & Finishing* 1958 Vol 4 (6) pp 31, 33 (Oct)

The preparation of meteorite specimens for metallurgical analysis is carried out by normal metallographic specimen techniques. A meteorite sample which could not be cut by silicon carbide was eventually cut by adding 10% boron carbide to the silicon carbide abrasive. Surfaces are ground smooth by coated abrasive papers, and polished with diamond paste on a fabric-covered lap. Minute diamonds found in meteorites have contributed to the understanding of the pressures to which meteorites are subjected. 3 illustr.
W *C 8.6 : C 12.6*

Study of the economics of fine grinding

A. A. Matalin. *Vestnik Mash* 1958 Vol 38 (7) p 67; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 191 (Nov) (Original in Russian)

X *C 13.0*

The KhSh-146-type machine for honing piston ring tops

P. S. Menaker. *Biul tekh-ekon inform* 1958 (3) pp 31-32; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1845 (Sep) (Original in Russian)

X *C 13.3*

Advantages of synthetic industrial diamonds for grinding wheels

N. A. Matthews, N. Leventhal. *Machinery* (London) 1958 Vol 93 (2390) pp 552-556 (Sep 3)

6 illustr. See *Ind Diamond Abstr* 1958 Vol 15 p A141 (Sep). *W* *C 2.6 : D 8.0*

The shape of wheels to come

J. Meehan (Brown & Sharpe Mfg Co). *Grinding & Finishing* 1958 Vol 4 (6) pp 28-30 (Oct)

Following a very brief survey of the development of the grinding wheel, the following future developments are suggested: (*i*) bonds with a lower coefficient of expansion; (*ii*) elimination of scratching which is possibly attributable to loose grains of the abrasive; (*iii*) development of a 'dry' lubricant, such as molybdenum disulphate or graphite; (*iv*) controlled orientation of abrasive crystals; (*v*) harder wheels for pre-loaded anti-friction bearings; (*vi*) uniform bond hardness; (*vii*) additional conductive bonds for electrolytic grinding; and (*viii*) wheel identification which will still be visible when the wheel is finished. 2 illustr.

W *D 8.0*

Automatic size grinding of splined shafts

Sigma Instrument Co Ltd, Letchworth. *Machine Tool Rev* 1958 Vol 46 (275) pp 106-107 (Sep-Oct)

The Sigmatrol controller, fitted on a grinding machine, automatically controls the size of workpieces having interrupted surfaces. The Sigmatrol is an electro-pneumatic unit by means of which the gaugehead contacting the work is linked with the electric and hydraulic controls of the machine. The set-up and operation are described. 3 illustr.

W *C 6.0*

The 312M universal cylinder-and-cone grinding machine

Ya. I. Tokarev. *Biul tekh-ekon inform* 1958 (3) pp 24-25; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1815 (Sep) (Original in Russian)

X *C 12.0*

Bore and face grinder trebles productivity . . . in Austin's new gear line

P. Trippe. *Metalworking Prodn* 1958 Vol 102 (44) pp 1909-1911 (Oct 31)

The Spandau SJ 11 automatic internal grinder was adapted to perform both bore and face grinding operations on gears in a single automatic operation. Tolerance on the bore is ±0.00025 in., and on the face it is ±0.0005 inch. As the workhead moves forward for finish grinding, a diamond truing device moves into position, trues the wheel, and withdraws. 3 illustr.

W *C 5.3*

Selecting an efficient machine tool design for grinding refractory bars

K. L. Veinberg. *Steklo i keram* 1958 Vol 15 (6) pp 22-26 (June); *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1815 (Sep) (Original in Russian)

X *C 12.5*

Large Wadkin sawing machine for aluminium plate

Spear & Jackson Ltd, Aetna Works, Saville Street, Sheffield 4. *Machinery* (London) 1958 Vol 93 (2396) p 906 (Oct 15)

Carbide tipped saws of 50 in. diameter, produced for use on a Wadkin aluminium plate sawing machine, had the top clearance angle of each tooth diamond lapped to within ±0.001 inch. 1 illustr.

W *C 8.2*

Grinding wheels of synthetic and natural diamonds (American comparative research). Schleifscheiben aus kuenstlich hergestellten und aus natuerlichen Industrie-Diamanten (Amerikanische Vergleichsversuche)

E. Zscherpe. *VDI Zeits* 1958 Vol 100 (30) p 1452 (Oct 21) (In German)

The article is based on an American report published by the Gen Electr Co, Michigan, in which the synthetic diamonds were compared with natural stones. It is found that synthetic diamond is more brittle than natural diamond. They are inferior to natural diamonds as regards tool life, when set in a metal bond. [See *Ind Diamond Abstr* 1958 Vol 15 p A141 (Sep)].

A *C 2.6 : D 8.0*

USP 2,837,878 (Jan 18, 1956) **N. E. Johnson, O. M. Johnson**

Abrading wheels with undercut relief grooves

By undercutting grooves in the surface of the wheel where it engages the work, less heat is developed and the abrading action is accelerated. The example described in the specification (see Fig 4) shows, right and left on the edge of the wheel, alternately staggered

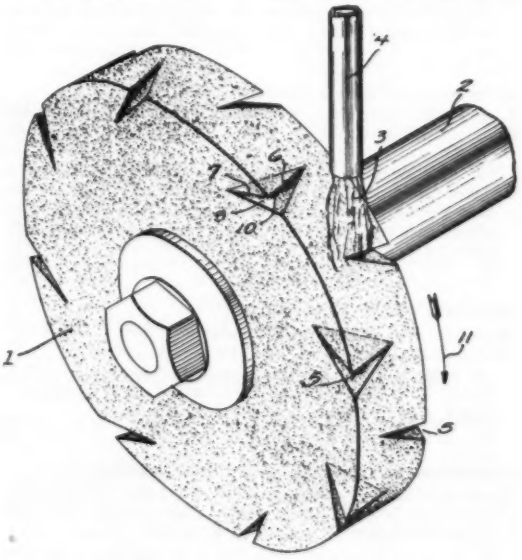

Fig 4. Abrading wheel with undercut relief grooves. USP 2,837,878.

notches 5 undercut backwardly so that an overhanging edge 10 behind each successive notch engages the work (Feb 4). (7 claims, 2 illustr). Ref cited: 4 USP; 1 BP; 1 FP.

J *D 8.01*

USP 2,839,873 (July 22, 1950) **M. L. Baxter jun, Gleason Works**

Method and machine for making curved tooth gears

The tooth shape of the generating gear is profiled as a surface of revolution on to a wheel which in turn is employed to true the rotating gear finishing tool. During the truing operation, truing wheel and tool are rotated about their axes and simultaneously, relative to each other, about another axis representing the axis of the generating gear, so as to generate a spiral surface on the tool. This spiral surface engages successive tooth surfaces on the gear to be made forming all the teeth in one continuous operation. The hard cup-shaped truing wheel is arranged on the armature shaft of an electric motor in the truing head, and is profiled by a diamond using a profiling mechanism as shown *eg* in USP 2,587,261. The gear finishing tool may be of abrasive material or may be of metal which has an abrasive applied to its surface during the gear forming operation. It may also be formed with gashes for a shaving process. The method is particularly applicable to curved tooth bevel and hypoid gears. (31 claims, 14 illustr). Ref cited : 15 USP ; see also USP 1,724,241.

J *C 5.01*

USP 2,839,874 (Apr 23, 1956) **P. Maker, Bryant Chucking Grinder Co**

Machine control mechanism

The mechanism is *eg* suitable for controlling the work cycle of an internal grinder which may have the following phases : advance into grinding zone, rough grinding, short longitudinal withdrawal for wheel truing by a diamond tool which is withdrawn afterwards, return to grinding zone, finish grinding, and return to initial position. The wheel is reciprocated through an adjustable stroke with continuous control of rate of acceleration, range, and position. Different modes of reciprocatory movement may be imposed. A hydraulic amplifier with control valves actuated by a multiple lever system and an exchangeable programme can enable a wide variation of strokes and speeds. (8 claims, 25 illustr). Ref cited : 6 USP ; see also USP 2,429,830 and 2,677,921. *J* *C 6.01*

USP 2,840,956 (Dec 5, 1952) **C. M. Grinage, Bullard Co**

Grinding machine

The machine is pre-set for a cycle of operations from either of two points, and is equipped for automatic grinding to within 0.0001 in. from a shoulder on a workpiece. It is electrically controlled and hydraulically operated. In order not to damage the shoulder, an adiustable fine feed speed has to be employed at the end or ends of the reciprocating stroke, with a dwell at the positive abutment using time delay relays. A truing diamond is arranged at the end of a piston rod for truing the wheel surface in exact parallelism with the ways of the grinding head. At any point during the cycle of operation, the grinding wheel can be raised to its upper position and trued with subsequent continuation of the pre-set cycle. Manual, mechanical, or hydraulic operation is also possible. (40 claims, 18 illustr). Ref cited : 18 USP. See also USP 2,355,625.

J *C 5.01*

USP 2,840,957 (June 7, 1957) **W. J. Warden, H. P. Wasshausen**

Lapping device

The device is intended for the mass production of quartz crystals, for use in the high frequency range, of a thickness of 0.001 in. (and less) polished to perfect flatness, parallelism, and thickness. An important part of the device is the precision ground glass work holder for a number of crystal blanks, each separately mounted in a carrier with optically flat surfaces in the same plane. The separate work holders may be rotated in their mountings and interchanged with other work holders so that reorientation of the crystal blanks can be effected without removal of the blanks from the holder. The amount of material ground off is limited by stop means so as to facilitate finishing to accurate dimensions. (4 claims, 5 illustr). Ref cited : 2 USP.

J *C 13.01*

NEW MACHINING METHODS

Electro-chemical machining

Anon. *Machinery* (London) 1958 Vol 93 (2400) pp 1095, 1143 (Nov 12)

A short survey of the expansion of electro-chemical machining, including electrolytic grinding where an electrolyte is used with a metal-bonded wheel, *eg* diamond for sintered carbide, aluminium oxide for HSS. Current applications of electro-chemical processes include the sharpening of single point tools and milling cutters having sintered carbide tips.

W *C 12.9*

Better metallographic techniques . . . polishing hard metals electromechanically

J. M. Dickinson. *Met Prog* 1958 Vol 74 (4) pp 142-144 (Oct)

Electromechanically polished surfaces show excellent retention of inclusions. Photomicrographs compare the new method with Wood's method, electrolytic polishing, and mechanical polishing with a diamond abrasive. Basically, the new method consists of applying a DC voltage to the specimen whilst abrading it on an alumina-electrolyte slurry. The importance of the variables is stressed. 3 illustr, 1 table.

W *C 12.9*

Present-day level of progress in the electrospark machining of metals and some scientific problems in this field

B. R. Lazarenko, N. I. Lazarenko. *Trudy Tsentral'noi Nauch-Issledov Lab Elek Obrab Materialov* 1957 Pt 1 p 9 ; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 180 (Nov) (Original in Russian)

X *C 12.9*

USP 2,838,652 (Aug 30, 1955) **C. P. Porterfield, Firth Sterling Inc**

Method and apparatus for spark machining

In order to obtain the short high current sparks found effective for practical machining rates, a liquid dielectric (a hydrocarbon) is usually kept in the spark gap between electrode and workpiece. However, present arrangements are not suitable *eg* for 'spark grinding' tungsten carbide tools which would be less expensive than working with diamond wheels. Spark grinding wheels are inexpensive and easy to maintain. But the rotating wheel would cause a spray of liquid obscuring the cutting operation, and create a fire hazard in the shop. The problem has been solved by applying the dielectric in a semisolid state. The maintenance of an adequate dielectric supply is further simplified by the use of a porous shaping electrode. One material found particularly suitable is a microcrystalline petroleum wax applied to the wheel from a wiper ring on a cylindrical container by a piston threaded into the container. (6 claims, 3 illustr). Ref cited : 7 USP ; 3 FP ; 1 BP. *J* *C 12.01*

POWDER TECHNOLOGY

Microscopic study of transformations in metal-powder compacts being heated

Ya. G. Davidovich, K. V. Kononova. *Zavodsk Lab* 1958 Vol 24 (1) pp 62-63 (Original in Russian)

The set-up used for the experiments is equally suitable for studies using metallurgical microscopes and microhardness testers. [Transl av, H. Brutcher, PO Box 157, Altadena, Calif. Price $2--, No 4295].

W *C 4.0 : D 15.2*

USP 2,839,413 (Mar 12, 1956) **K. M. Taylor, Carborundum Co**

Refractory body containing boron nitride

Bodies are formed by mixing boron nitride in granular or powdered form with finely divided silicon or aluminium metal, with or without the addition of a small amount of a temporary binder or plasticizer to provide green moulded strength. The article is then shaped by any of the known methods (pressure moulding, tamping, slip casting, extrusion) and dried. It is fired in an atmosphere of ammonia, nitrogen, or other non-oxidizing atmosphere containing nitrogen to convert the silicon or aluminium to silicon nitride or aluminium nitride. The body may contain 3 to 92% (weight) boron nitride and 97 to 8% of a silicon nitride or aluminium nitride or silicon-aluminium nitride bond. The bodies may be used for high temperature applications (rocket combustion chambers, jet nozzles) and also for grinding wheels, polishing materials, and hones. They offer possibilities in the electrical and radio industries. (20 claims). Ref cited : 5 USP ; 1 BP.

J *D 14.01*

DIAMOND RECOVERY

The ASTE Exhibition at Philadelphia, USA. Die ASTE-Ausstellung in Philadelphia, USA

Anon. *Werkstattstechnik & Maschinenbau* 1958 Vol 48 (10) pp 552-553 (Oct) (In German)

Included in the article is a description of a diamond dust collector which makes it possible to recover 30% of the diamond contained in a wheel, which means a saving of 10% of the wheel cost. The collector works on the principle of centrifugal force, so that no filtering is necessary. 9 illustr. *A* *D 7.6*

SURFACE FINISH TESTING

Piezo-electric method of measuring surface roughness

I. V. Dunin-Barkovskii. *Vestnik Mash* 1958 Vol 38 (7) p 61 ; *DSIR Transl Contents Lists Russ Period* 1958 (116) p 191 (Nov) (Original in Russian)

X *D 15.4*

The behaviour of metal surfaces in planing processes and machining. Oberflaechenverhalten von Metallen bei Gleitvorgaengen und bei der Zerspanung

R. Krause. *Ind Anzeig* 1958 Vol 80 (84) pp 1279-1281 (Oct 21) (In German)

In making up data about the state of the surface of metal to be machined, a conical diamond stylus, with a radius of about 2×10^{-3} mm, was used for surface finish testing. 5 illustr. *A* *D 15.4*

Instrument for measuring macro and microroughness of working surfaces of grinding wheels

S. A. Popov, N. P. Malevskii. *Izv vys ucheb zav mashinostr* 1958 (1) pp 122-127 ; *Library of Congress Mthly Index Russ Access* 1958 Vol 11 (6) p 1815 (Sep) (Original in Russian)

A *D 15.4*

USP 2,841,008 (Sep 15, 1951) **J. H. Brems, J. B. Bidwell, General Motors Corp**

Surface smoothness measuring means

The gauge head is drawn over the surface to be tested by hand, while the amplifying and indicating means may be connected by cable to the head and arranged where convenient. The head carries a stylus on a spring-held lever system connected to an electronic tube with a flexible wall through which one electrode extends, so that movement of the internal electrode causes variations in the electrical circuit. A viscous coupler consisting of plates with a layer of oil is inserted between the stylus holder and the electronic tube to act as a high frequency coupling element while permitting slow adjustment of holder and tube. (8 claims, 4 illustr). Ref cited : 10 USP.

J *D 15.01*

CORRIGENDA

See *Ind Diamond Abstr* 1958 Vol 15 p A155 (Oct)
For ' BP 2,827,037 ' read ' USP 2,827,037 '.

See *Ind Diamond Abstr* 1958 Vol 15 p A69 (May)
Ceramic tool bits are extremely hard wearing
For ' p 37 ' read ' p 57 '.

IDR REPRINT SERVICE

The new edition of the *Industrial Diamond Review* Reprint Service lists is available *gratis* from the Industrial Diamond Information Bureau, 2 Charterhouse St, London EC 1. The new list is a complete record of all reprints—*Industrial Diamond Review* articles, industrial diamond features from contemporary journals, and data sheets—held by the Information Bureau. Reprints contained in the list are available from the Industrial Diamond Information Bureau, at the above address. A charge of 1s per reprint is made as a contribution towards costs.

Important

It is important to note that in cases where reprints requested are not detailed in the new list, *ie* photostats and reprints specially obtained for readers, the charge will vary. The following reprints, included in the Reprint Service list, are a selection of *Industrial Diamond Review* articles which appeared in 1957:

PUBLICATIONS RECEIVED

BOOK REVIEWS

13th Annual Meeting and International Diamond Drilling Conference, May 31 - June 2, 1956, and 14th and 15th Annual Meetings May 31 - June 1, 1957, June 6-7, 1958, respectively

Canadian Diamond Drilling Association, Suite 2009, Star Building, 80 King Street West, Toronto 1, Canada. Price : $3.50 per copy

The 1956 Annual Meeting of the CDDA, the 13th, was held in Toronto in conjunction with the International Diamond Drilling Conference. Papers presented at that conference are available in the form of a 61 pp book. The Papers include 'Core recovery in soft formations', by A. E. Ross, 'Lower diamond drilling costs with wireline core barrel', by V. N. Burnhart, and 'Standardization of screw threads for diamond equipment' and 'General drilling practices in Australia and diamond blast hole drilling in quarries', both by J. P. Jeffers.

Papers to the 14th Annual Meeting of the CDDA, held in Toronto in 1957, are available in a 57 pp book. Papers given included 'Loose diamonds' by B. Jolis, 'The use and care of diamond drill bits', by H. Wallace, and 'Oil from diamonds', by J. F. Langston.

This year's Annual Meeting, the 15th, was also held at Toronto, and again the Papers to the Meeting have been published. The book has 71 pp, and, as a welcome innovation, the pages are numbered consecutively instead of each paper having individual pagination. The Papers to the Meeting include 'Research in the Diamond drilling industry', by J. D. Cumming, 'Man-made industrial diamonds', by J. D. Kennedy, and 'The current diamond market', by R. Edgecombe.

W *C 9.21*

Report of the Panel on Industrial Diamonds of the Materials Advisory Board Division of Engineering and Industrial Research, National Academy of Sciences, National Research Council, Washington 25, D.C., Aug 30, 1957

65 pp, illustr, appendices. Not generally available

This book is in the form of a report to the Panel on Industrial Diamonds. The first task of the reporting body was to evaluate the tests made on synthetic diamonds carried out by the General Electric Co, Norton Co, and Carborundum Co, and to comment on the adequacy of the tests, at the same time suggesting future lines of research where this was thought to be necessary. The second part of their duty was to ascertain what data were available on which specifications might be based, and to indicate what further information would be necessary to establish such specifications.

Comparison tests of synthetic and natural diamonds are described and evaluated.

The Panel's investigators do not favour a Government financed testing programme, as any work carried out would be a repetition of the investigations already conducted. A standardized performance test is recommended for synthetic diamonds. The Government is strongly urged to aid the development of production in this field, and means by which this aid might be provided are suggested.

W *C 1.6 : C 2.6*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

Mineral resources of Australia. Summary Report No 41. Natural Abrasives

Z. Kalix. A. J. Arthur, Commonwealth Government Printer, Canberra, Australia. 1956, 48 pp, illustr. Price : 3s

A wide variety of abrasives is to be found in Australia, and this booklet summarizes the production and occurrence of abrasives ranging from diamond to sand.

The physical properties of diamond, and some of the names given to different types of diamond, are briefly mentioned, and a table shows the composition, hardness, and specific gravity of diamond and other abrasives. World diamond production and the operation of the diamond industry are described, and the principal diamond producers are mentioned in order of output. Under a section on the uses of abrasives it is said that Australian diamonds are generally believed to be the hardest known, being superior to imported stones for drilling purposes.

The localities in which diamonds occur in Australia, where they were first found in 1851, are detailed. New South Wales is the primary producer, and output there has dropped from a record of 25,874 ct in 1899, to 731 ct in 1955. Notably lean years were 1935, 1940, and 1948, when production was nil.

Other figures on industrial diamonds which are given include Australian imports, exports, and estimated domestic requirements. *W* *C 1.24*

American Machinist : 1959 production planbook and buyers' guide issue

American Machinist, McGraw-Hill Publishing Co Inc, 239 S American St, Philadelphia 5, Pa. Mid-Sep 1958, 545 pp, illustr. By subscription

The introduction to this publication briefly surveys the machinery outlook for 1959. Subsequent sections present short abstracts of some past *American Machinist* features under the following headings : (*i*) management and personnel ; (*ii*) machining ; (*iii*) tooling ; (*iv*) press-working, moulding, and casting ; (*v*) inspection, testing and quality control ; (*vi*) assembly, heat treatment, and finishing ; (*vii*) materials and components ; (*viii*) materials handling and services ; and (*ix*) used and rebuilt equipment and prize ideas.

More than a third of the publication is reserved for a useful index of products and their manufacturers, which includes the names and addresses of American companies who manufacture diamond tools.

W *C 1.51*

TRADE LITERATURE

Diamond wheels, catalogue no 4

Diamond Tool Research Co Inc, 380 Second Ave, New York 10, NY. 36 pp, 5½ × 8½ in., illustr

Originally reviewed in *Bibl Ind Diamond Appl* 1956 Vol 13 p B275 (Oct), the catalogue now includes a discount schedule dated Sep 2, 1957.

W *D 8.0*

How to get the most out of your drill program : choose the right diamond for the job

Diamond Tool Research Co Inc, 380 Second Ave, New York 10, NY. 4 pp, 8½ × 11 in., illustr

Reprinted from the June 1957 issue of *Engineering and Mining Journal*. [See *Bibl Ind Diamond Appl* 1957 Vol 14 p B169 (Sep)]. *W* *C 9.21*

Oriented vector diamond tools for wheel dressing and truing

Golconda Corp, 3814 N Knox Ave, Chicago 41, Ill. 4 pp, 8½ × 11 in., illustr

The diamond used in the Orvec truing tool is obtained by sawing a slab of precisely determined cross-section from a high-quality diamond. The slab is oriented by x-ray diffraction techniques, and transferred to its nib by accurate mechanical methods which maintain the orientation. The nib is clamped into a special holder, and, through a nut and swivel arrangement, it can be swung to the left or right of the normal truing position. The diamond can be completely used up and the nib thrown away. *W* *C 5.0*

'Lorantco' precision mounted points and grinding wheels

Lorant & Co Ltd, 98-100 Croydon Rd, London SE 20. 1 pp, 8½ × 11 in., illustr

Lorantco mounted points and wheels are available in vitrified-bonded aluminium oxide, vitrified-bonded silicon carbide, and different abrasives for ferrous and non-ferrous metals. All points and wheels are diamond trued before sale. A selection of points and wheels available is shown. *W* *D 8.0*

How Hycalog V-Door diamond drill bits are setting new records in footage per trip

Hycalog Inc, 505 Aero Drive, Shreveport, Louisiana. 4 pp, 8½ × 11 in., illustr

A new diamond drill bit, the V-door, uses the valve action of a small core against the drilling fluid orifice to divert the fluid through specially designed holes. This action keeps the cutting surfaces thoroughly flushed. A combination of bit design and hydraulic pressure then breaks the short core into small fragments, thus allowing the drilling fluid to surge into the V-Door port and force the core fragments into the discharge port and out of the hole.
W *C 9.21*

Tungsten carbide inserts

Mindrill Ltd, 86-106 Plenty Rd, Preston N 18, Victoria, Australia. 2 pp, 8 × 10½ in., illustr

The wear on the trailing edge of diamond core bit waterways can be reduced by inserting a tungsten carbide segment in a position between the waterway and the diamond-impregnated area of the bit. The reinforcement makes the bits slightly more expensive, but the saving in gauge diamonds will compensate for this. *W* *C 12.0*

A selection of machine tools available from stock

Stedall Machine Tool Co, 145 St John St, Clerkenwell, London, EC 1. 4 pp, 8 × 10 in., illustr

Among the machines available are a number of drilling machines, grinding machines, lathes, milling machines, et cetera. *W* *C 6.0*

Collected catalogues [Anocut electrolytic grinders]

Anocut Engg Co, 631 W Washington St, Chicago 6, Ill.

Two general catalogues describe the features of Anocut equipment and list a selection of 33 materials on which it has been used. A detailed description of an Anocut electrolytic grinder in operation is provided by a reprint from the January 1958 edition of *Production Equipment*. A diamond-impregnated steel wheel is used in conjunction with an electrolytic power unit, and wheel life is reported to be longer than that of a conventional diamond wheel by a factor of ten. In a case cited, a Hammond grinder, previously scheduled for replacement, was converted into an efficient unit by installing the Anocut equipment.
W *C 5.3 : C 12.9*

Collected catalogues [UR products]

J. Urbanek & Co, Frankfurt aM, Baumweg 45-47, Germany. (In German)

Flexible diamond grinding wheels, cut-off wheels, small grinding wheels, hand-lapping tools, and diamond files are diagramatically presented, and appropriate bonding, mesh size, concentrations, and wheel forms are given. Hints for correct usage are also provided.

Different applications of industrial diamonds, in cutting, drilling and engraving tools, grinding wheels, and files are shown in one catalogue; diagrams of shapes and measurements of these tools are provided. A truing tool catalogue describes different types of diamond truers, some with only three or six diamonds in them, others with up to 80 grains/carat. They can be had either for flat working or for working at an angle. Diapur, Diamix, and Diapurol diamond pastes have a catalogue to themselves. They can all be obtained in special dispensers, and Diamix can be had in a tube. A general catalogue gives an account of the diamond structure and the physical properties of diamond, and summarizes its applications. The rest of the booklet is divided into sections on truing diamonds, turning diamonds, hardness testing diamonds, and diamonds for special applications.
A *D 8.0*

Diamond files and tools S-bonded

J. Urbanek & Co, Frankfurt aM, Baumweg 45-47, Germany. 6 pp 7 × 9½ in., illustr. (In English)

Measurements and other specifications are given concerning five diamond files, of which the machine file, the needle file, and the file for hand filing machines can be had in different shapes suited to the operation for which they are required. The other two are a slot and a grooved file. Diamond grinding pins in standard shapes, and diamond grinding tools for use especially on hand grinders or hones and hollow drills are also specified. *A* *D 8.0*

Vickers portable gear hardness tester

Vickers-Armstrongs (Engineers) Ltd, 13 City Rd, London EC 1. 10 pp, 7¼ × 11¼ in., illustr

An ocular head micrometer is used in conjunction with a diamond pyramid indenter, so that the reading obtained with a 30 kg load is a standard VPH number. The load is applied through a spring-loaded compression piston, hydraulically connected to the indenting piston and diamond indenter.
W *C 4.0*

Vickers portable hardness tester

Vickers-Armstrongs (Engineers) Ltd, 13 City Rd, London EC 1. 12 pp, 7¼ × 11¼ in., illustr

The tester, supplied with adjustable chain clamps, can work with loads of 10 or 30 kg. Several patented features are incorporated, but it is basically an indenting unit with a standard diamond pyramid indenter and a microscope measuring fixture. Guard strips protect the diamond from damage in case of too heavy an application of the unit to the specimen. The load is applied through a spring and hydraulic mechanism.
W *C 4.0*

Collected catalogues [Grind-All equipment]

Harig Mfg Corp, 5757 W Howard St, Chicago 31, Ill.

A Grind-All fixture is available for simplifying the precision grinding of perforators. V-block capacity is 1½ in. diameter.

The Grind-All radius truer arm is an attachment for diamond forming radii from 2 in. convex to 4 in. concave. Wheels up to 10 in. diameter can be trued. Set-up instructions are provided. A further attachment permits ball-seat type punches to be ground.
W *C 5.0*

Diamond traps manufactured by American Industrial Diamonds Inc

American Industrial Diamonds Inc (AID), 6851 Chase Road, Dearborn, Mich. 6 pp folder, 8½ × 11 in., illustr

Suitable for installation in any stationary exhaust system or portable dust collector, the models 1-B and 2-B diamond traps are claimed to give a maximum return of trapped diamond on high wheel consumption operations. Both models can be attached to any type of tool or cutter grinder. Type 1-B is designed to pass aluminium oxide and sintered carbide to the central system, and 2-B is for use on machines using diamond wheels exclusively. *W D 7.6*

Ceramics prove themselves on copy turning

George Fischer Ltd. *Metalworking Prodn* 1958 Vol 102 (42) pp 1820-1821 (Oct 17)

Details are given of ceramic tooling progress using a 99.8% pure sintered aluminium oxide. The tool angles required for ceramic tools are shown. Cutting speeds have been more than doubled. 2 illustr. *W C 8.72*

Elgin diamond wheels

Elgin Nat Watch Co, Elgin, Ill. 44 pp, 8½ × 11 in., illustr

Sections and dimensions of grinding wheels available are shown, and there are two pages of advice on diamond wheel usage. The advice covers (*i*) coolants, which should be used wherever possible; (*ii*) surface speeds, which should be between 4,500 and 6,000 surface ft/min; (*iii*) feeds; (*iv*) dressing to remove glaze, using different forms of silicon carbide, depending on the type of wheel being dressed; (*v*) when to use cup wheels; (*vi*) when to precision grind; and (*vii*) how to decide between resinoid and metal bonds when cutting-off and slotting. *W C 5.0 : D 8.0*

Dilectra diamond wheels. Meules diamantées ' Dilectra ' Ets Jacques de Jong, 22 rue du Château, Bagnolet (Seine), France. 1 p, 8½ × 10½ in. (In French)

These wheels have an electrolytic bond. The extra firm grip on the abrasive diamond permits the grains to protrude to the maximum degree. Dilectra wheels can be used for sharpening tools of HSS and very hard steel. *A D 8.0*

Firms issuing trade literature connected with the industrial diamond and allied fields are reminded that we would welcome the receipt of such literature for review in this journal. Copies should be sent to the Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd, 2 Charterhouse St, London E C I.

Readers are requested to note that trade literature reviewed in this journal is not available for loan, nor is it displayed in the Information Bureau's Library. Readers wishing to obtain copies of the catalogues are requested to apply to the address which appears immediately under the title of the review.

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2,849,876 H. H. BLOSJO. Hardness testing device.

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2,850,849 S. M. BABBITT, ECLIPSE COUNTERBORE CO. High-speed flute-grinding machine.

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2,850,854 S. LEVY. Method for removing material.

2,850,894 C. W. CLARK, CLARK INSTRUMENT CO. Hardness tester workpiece clamping means.

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GENERAL NOTES

The Industrial Diamond Information Bureau is included in the Diamond Research Organization of Industrial Distributors (Sales) Ltd (incorporated in the Union of South Africa), together with the Diamond Research Laboratory in Johannesburg.

Abstracts

The Bureau prepares abstracts of current scientific and technical literature, including patents, on industrial diamonds and associated subjects. These are published monthly in *Industrial Diamond Abstracts*, which is supplied free to those concerned with the use of diamonds for industrial purposes, and to specialist libraries. The publishers do not claim any copyright in respect of abstracts in this journal. No specific acknowledgement is made to other abstract journals, and no objection will be made to other abstract journals using the contents.

The list of journals (latest issue, September 1955) from which *Industrial Diamond Abstracts* is compiled will be supplied on request.

Library

The Bureau has a Reference Library which seeks to cover world literature on the application and production of diamond tools. It is kept up to date by a careful examination of new publications announced in abstract and technical journals, and covers, in addition to English, German, French and Russian books. The library specializes in technical and scientific pamphlets.

Patent Abstracts

Patent lists are prepared from official patent journals of the major industrial countries, and patent abstracts in general from the printed patent specifications. Printed copies of British patent specifications accepted may be obtained from the Patent Office, Southampton Buildings, London WC 2, at 3s each. Numbers given under British applications for patents are for reference in all correspondence up to acceptance of the complete specification.

The following abbreviations are used :—BP for British Patent, USP for United States Patent, DAS for German Patent Application, DBP for German Patent (GP for German Patents issued prior to 1950), FP for French Patent, Canad P for Canadian Patent, and RP for Russian Patent.

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1. **Loan Service :** much of the literature abstracted in this journal is available in its original form, and can be borrowed for a period of fourteen days (in Great Britain only).

2. **Reprints :** copies of certain selected articles on industrial applications of diamond are available and can be supplied on request at a charge of 1s each, post free. New reprints are announced from time to time in this journal, and a classified list of reprints, dated September 1958, is available free on request.

Technical Information

The Bureau offers the resources of its considerable literature holdings to those seeking specific information on diamond tool and similar applications. Problems requiring fuller technical assistance can be referred to the Diamond Research Laboratory, Johannesburg.

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LIST OF PUBLICATIONS, DECEMBER, 1958

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***LIST OF PERIODICALS IN THE INDUSTRIAL DIAMOND INFORMATION BUREAU LIBRARY AT MAY 31, 1958:** Alphabetical, 8 pp, 7⅜ x 9¾ in. A list of periodicals available for loan from the Industrial Diamond Information Bureau Library. This does not replace *List of Periodicals* (above), which is a list of periodicals abstracted in *Industrial Diamond Abstracts*, many of which are not held by the Library.

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* *Publication free of charge.*